

# Impact of HIV/AIDS on Food Security in Pala Sub-Location, Bondo District, Kenya

S. B. Otieno, Were Fred, E. W. Kabiru, K. Waza

**Abstract**—Background: HIV/AIDS is leading to the loss of labor through sickness and subsequent death, this is leading to the neglect of farm and off-farm activities, with the subsequent loss of potential income and food security. The situation is sensitive to seasonal labour peaks in agriculture. This study was done to determine the impact of high HIV prevalence in farming systems and food security in Pala Bondo District, Kenya. Methods: In this study, 386 respondents were randomly chosen in Pala Sub-Location. The respondents and key informants were interviewed using structured questionnaire. The data were entered and analyzed using SPSS version 16. Results: It was established that majority of respondents (67%) were between 18 and 35 years  $\{\chi^2 = (1, N = 386) = 13.430, p = 0.000\}$  (chimney effect). The study also established that 83.5% of respondents were married  $\{\chi^2 = (1, N = 370) = 166.277, p = 0.000\}$  and predominant occupation being farming and fishing (61%), while 52.8% of farm labour was by hand, 26% by oxen, and 4.9% mechanized. 73.2% of respondents only farm 0.25 to 2 acres, 48% mentioned lack of labour in land preparation  $\{\chi^2 ((1, N = 321) = 113.146, p = 0.000)$ , in planting  $\{\chi^2 (1, N = 321) = 29.28, p = 0.000\}$ . Majority of respondents lack food from January to June, during which 93% buy food. Conclusion: The high HIV prevalence in Pala has affected the farm labour leading to food insecurity.

**Keywords**—Food security, HIV, AIDS, labour.

## I. INTRODUCTION

HIV and AIDS pandemic is a major threat to achieving the millennium development goals which include combating HIV spread, extreme poverty and hunger by 2015 [2]. The greatest concern of rural households in Kenya today is food security, the challenge therefore still remains, on HIV/AIDS policies development and institutionalization to contribute towards halting the devastating impacts of pandemic on human capital. Agriculture sector constitutes major source of rural livelihood in Kenya, the sector engages 80% of the nation's workforce, and majority depends on the sector for both subsistence and cash income [5]. However, the AIDS Pandemic has hugely disrupted the success in the agricultural economy and the sector is now faced by complex issues of gender in production and service delivery, there is evidence that workers in the agricultural sector are vulnerable to AIDS and its devastating effects [6]. The effect has reduced programme implementation capacity due to limited ability of extension workers to address challenges posed by AIDS on food production capacity [5].

Samwel B Otieno is with the Vet. Research Labs, Kenya (corresponding author; e-mail: samwelbotieno@yahoo.com).

Fred Were is with the University of Nairobi, Kenya.

Ephantus Kabiru is with the Kenyatta University, Kenya.

Waza Kaunda is with the Kenneth Kaunda Foundation, Zambia.

AIDS has in addition posed adverse effects on agricultural development. Similar challenges on extension service delivery cross cut the institutional, technical and operational components. Extension is complex and tied to such activities as land tenure issues, crop production, technological adoption, agricultural research, credit and marketing systems and cultural issues some of which are insensitive to gender. All these services have far reaching consequences on overall agricultural development. Also, links between extension service, food/nutrition security at household and national levels are vital. Diminished extension service delivery is likely to undermine food supply not only at house hold level but also nationally. In macroeconomic terms, arrange of studies suggest that AIDS can lower GDP growth by up 1.5% per year [4]. And in atypical scenario of prevalence of 20%, the pandemic has a potential of lowering the GDP by up to 2.6% per year. But although the potential impact of HIV/AIDS on productivity in labor in Africa has long been recognized, little rigorous empirical research on the magnitude of that impact has been done to inform policy on the same. Study in Kenya showed that adult deaths in Kenya has significant impact both on crop income and value of households assets [6], while in another study of Livestock Development established that death of farmers has led to downshifting from large livestock to small stock due to reduction of labor and skills in the industry[7]. These scenarios could be made worse by high mortality rates amongst extension workers who should bridge the gap of agricultural information and knowledge transmission to young farmers and children that has been brought about by the AIDS pandemic [7] There has been little attention of impact of HIV/AIDS on Ministry staff and normal operations while at the same time, substantial numbers of staff have been lost at least one colleague to AIDS.

This study was therefore done to determine the impact of HIV Food Production in the Pala Sub-location Bondo Division.

## II. MATERIALS AND METHODS

### A. Study Population in Pala

The study focused on communities in Pala Sub-Location in Bondo District. The choice of study district was based on HIV/AIDS prevalence, and predominant livelihood activity of the study population. The district lies at an altitude between 1125 to 2275 meters above the sea level and it is relatively, highly populated. The farming activities in these communities are guided by rituals many of which involve sex as a factor traditionally, widows retain use of land through inheritance, and due to resentment most of them now end up in beaches

where they continue spreading the HIV in case of AIDS widows.

### B. Sample Size Determination

Sample size was determined as:

$$N = \frac{Z \times Z \times P (P-1)}{C \times C}$$

where N is the sample size; Z is the standard deviation corresponding to 1.96 or 95% confidence interval; C is the degree of accuracy set at 10%; P is the HIV prevalence, which is 7.8%; this gives a minimum sample size at 280 however a sample size of 386 was used in this case.

### C. Inclusion Criteria

- Residents of the area
- 18 years and above
- Not residing in Market Centres
- Given Consent Exclusion

### D. Exclusion Criteria

- Below 18 years
- Non-Residents
- Not Consented
- Residents of Market Centers

### E. Standardized Questionnaires

The enumerators did in-depth interviews of sampled respondents using standardized questionnaires. This enabled collection of quantifiable information.

### 1 Key Informant Interviews

Interviews were conducted with eight key informants who were used to explore and deepen the understanding of issues raised and validate the information collected by the questionnaires. The key informants included District Agricultural Officer, Medical Officer of Health, District Veterinary Officer, Social Worker, Local Chief, and village elders. The discussion also explored the corroborating evidence of the already adduced factors from the individuals' respondents.

## III. RESULTS AND DISCUSSION

### A. Impact on Demographics of Study Population

#### 1. The Age Distribution of Respondents

Most respondents were in age group 18-35 years (67.9%). The results shows that, age group 46 to 55 years constitute only 11% while age group 56 years and above constitute 13%. This age distribution showed "chimney effect" as in Fig. 1 indicating increased dependency ratio. This age distribution was found to be significant  $\{\chi^2 (1, N = 386) = 13.430, p = 0.000\}$ . This age distribution show dramatic changes in structural composition of the population in these villages. It is likely that the demographic changes observed are due to the impact of HIV and AIDS in this community. In these scenarios, there are fewer adults than under normal conditions

[3]. These observations first reported in 1994 by [1] are typical of highly HIV impacted communities. The death of adults translates into a loss to society of existing knowledge and skills. This also leads loss of transmission of knowledge to succeeding generations, which compromises the agricultural productivity [3]. This has serious bearing to food security in this community, since it compromises production hence supply of nutrient rich foods. It also shows a reducing life expectancy with 67.9% of the population living up to 35 years of age. These demographic changes normally affect decision horizons of this community resulting in short term risky decisions and short term risk a avoidance [3]. This risk taking decision encourages the youths to engage on sexual experimentation since they believe that they are likely to be infected and die early with severe implication to the epidemic as they are likely to get infected and spread the infection. This is perhaps why despite majority of the respondents being below 35 years about 83.5% are married. The risk avoidance tends to discourage investment and passing of information and knowledge of farming from generation. These are reflected by the increased number of respondents who are doing petty trade (24.6%) and those depending on market for household food at 50%.

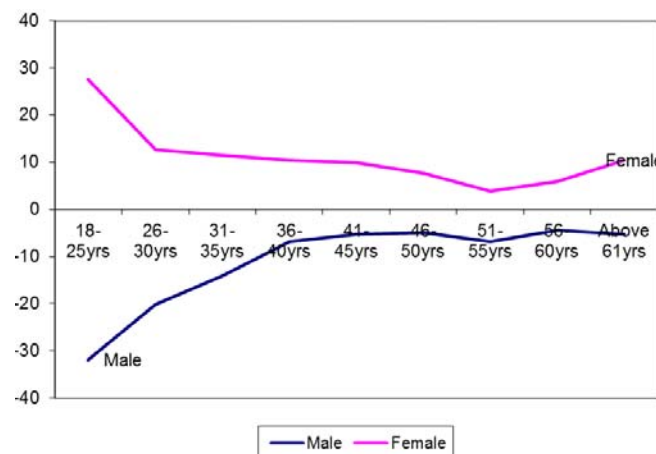


Fig. 1 Chimney Effect

#### 2. Gender Distribution of Respondents

Gender in equality is one of the driving factors behind spread of HIV. In this study, it was found that 52.8% of respondents were males while the females were 47.2% as shown in Table I. This distribution was found not to be significant,  $\{\chi^2(1, N = 386). 1.254 p = 0.263\}$ . This perhaps reflects on a normal population which represents an ideal distribution, where ratio of males to females is almost equal. Gender inequality tends render women more vulnerable to HIV/AIDS infections while they bear the most burden in farm work at household level.

TABLE I  
 DISTRIBUTION OF RESPONDENTS BY GENDER

Gender	Count	%
Male	204	52.8%
Female	182	47.2%

### 3. Distribution of Respondents According to Marital Status

Table II shows the marital status of the study population. It was established that most of the respondents were married (83.5%) while the unmarried was 16.2%, and 0.3% were widowed as shown in Table II. This distribution of marital status was found to be significant  $\{\chi^2(1, N=370) = 166.227 p=0.000\}$ .

Marital Status	Number	%
Married	309	83.5%
Single	61	16.2%

### 4. Education Level of Respondents

The results indicate that majority of respondents (71%) had primary level of education while about 8.8% had none as in Table III. The level of literacy was found to be significant  $\{\chi^2(1, N = 386) = 262.285 p = 0.000\}$ . These findings reflect high literacy levels, which could be because majority of respondents were young and most of them are products of free primary education program of Government of Kenya.

### 5. Predominant Occupational Activity of Respondents (N=370)

TABLE III  
HOUSEHOLD DEMOGRAPHICS OF STUDY POPULATION

Demographic detail		Frequency	Percent (%)
Gender	Male	204	52.8
	Female	182	47.2
Position in the family	Head	168	43.5
	Spouse	99	25.6
	Parent	51	13.2
	Other	68	17.6
Marital status*	Married	309	83.5
	Single	60	16.2
	Widowed	1	0.3
Educational level	None	34	8.8
	Primary	274	71.0
	Secondary	75	19.4
	College/University	3	0.8
Age	Less than 25 yrs	115	29.8
	26-35 yrs	114	29.6
	36-45 yrs	62	16.0
	46-55 yrs	45	11.6
	56 yrs and above	50	13.0
Religion	Christian	370	96.4
	Muslim	10	2.6
	Others	6	1.5
Occupation	Farmer	125	33.8
	Fisherman	102	27.6
	Small businessman/woman	91	24.6
	Others	52	14.0

As shown in Table III, most respondents were crop/livestock and farmers (33.8%) and fishers (27.6%), the two categories constituted 64.4%. Petty trade and other occupation constitute only about 38.6% as shown in Table V. These findings tend to concur with the policy documents which indicates that small holder farmers constitute about 60% of all

farmers. However, it also shows that there is tendency towards increase of off farm income generating activities. This is a worrying trend for the food security situation in the country as it suggests shift in labour from agriculture to other sectors.

### B. Impact on Food Production

#### 1. Household Asset Ownership

HIV/AIDS, agriculture, food security, poverty and rural mobility form complex of interrelationships and competing forces [2]. The study shows that the respondents own various household assets as shown in Table IV. These form important capital assets used in agricultural production, and are important for survival strategies in time of shock [3]. Most (92%) households own hand hoe, 80.6% own radios while only 25% own cereal stores. While 81.6% own chicken only 47% indicated they own bovine. This suggests downshifting of farming into less labor intensive methods like chicken keeping instead of the larger animals. This is shown in Table IV.

TABLE IV  
HOUSEHOLD ASSETS IN PALA

Farm asset owned	Yes (%)	No (%)
Jembe	92.2	7.8
Wheelbarrow	23.6	76.4
Radios	80.6	19.4
Bicycles	70.7	29.4
Ox plough	21.1	78.9
Mobile plough	46.1	53.9
Bulls	30.5	69.5
Cows	47.4	52.6
Stores	25.9	74.1
Cowshed	47.0	53.0
Chicken	81.6	18.4
Goats and sheep	55.6	44.4
Fishing net	28.3	71.7

#### 2. Land Ownership

The study shows that 77% of respondents have 5 acres and below. About 26.4% had 2-5acres, 26.4%, 1-2 acres, and 23.1% had above 5 acres. This distribution was found to be significant  $\{\chi^2(1, N=386) = 65.154, p=0.000\}$  as shown in Fig. 2.

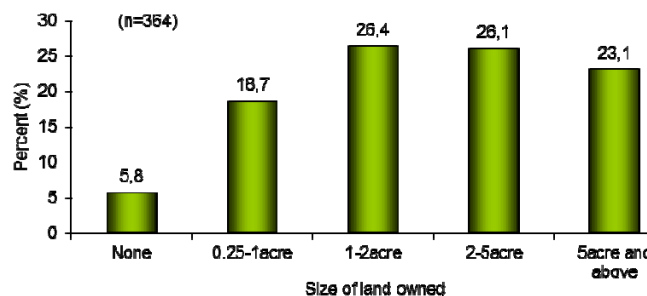


Fig. 2 Sizes of land owned in Pala

#### 3. Type of Labour Used in Agriculture

The study also established most farm labor (52.8%) was by hand, 26% by oxen, 14.6% by hired labor, while 4.9% was by tractor. While majority own land the study shows that there is

over reliance on hand power with 50% of respondents using human labor in their farms. This could be attributed to several factors including land sizes, loss of livestock due to funeral rituals, livestock deaths due to increased pests and sales. However, productivity of human labor is further compromised by their own physical weakness, HIV/AIDS which has contributed to demise of the labor force. This could also be effect of reduction in fertility rate due to demise of adults [3], which has indirectly contributed to fewer births than normal.

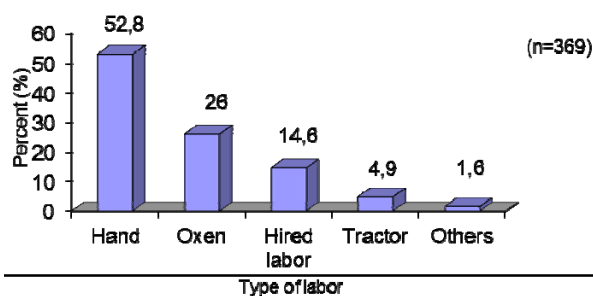


Fig. 3 Labour used in land cultivation

#### 4. Size of Land Under-Cultivation

Several farm activities have been affected as shown in Fig. 4 and hence food production, these include planting,  $\{\chi^2(1, N = 321), = 113.146, p = .000\}$ , land preparation  $\{\chi^2(1, N=310) = 41.689, p=0.000\}$  and pest control  $\{\chi^2(1, N=320),=29.28 p=0.000\}$ .

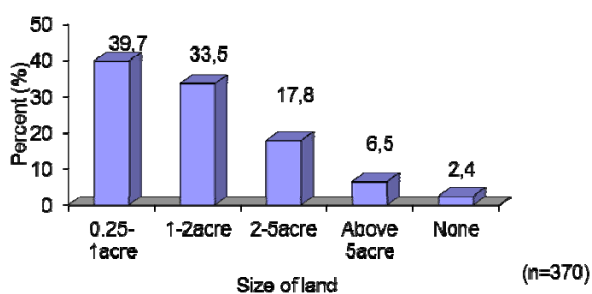


Fig. 4 Sizes of land under cultivation

As shown in Table V, several respondents revealed that they had experienced decreased agricultural production in previous 5 years. A number of factors mentioned and related to HIV and AIDS effects explained the decreased agricultural production, such as depleted agricultural labor force, loss of livestock due to funerals, this was also reflected in decreased acreage under cultivation. About 48.9% of households mentioned reduced farm labor as a factor in affecting production. This was further reflected in other farm activities affected including, harvesting (45.4%), pest control (64.9%), weeding (50.8%), and planting (78.7%). Some other farm activities affected include livestock farming by 56.8%, harvesting (45.4%), and acreage under crop farming (3.4%). It is believed that AIDS related mortality is seriously undermining the agricultural production, affecting food consumption in this rural community [4]. The community faces reduction in indigenous agricultural knowledge about

farming methods. This labor loss observed is partly due to changes in demographic structure leading to increased dependency ratio.

TABLE V  
IMPACTS ON FOOD PRODUCTION

Activity affected		N	Yes (%)	No (%)
Planting	Problem of getting seeds	343	78.7	21.3
	Seeds are expensive			
	Lateness because land preparation is done late			
Land Preparation	Lack of tools	334	67.7	32.3
	Lack of finance			
	Digging using hands			
	Lack of labour			
	Limited time			
Weeding	lack of food for laborers	321	50.8	49.2
	Few resources			
	Lack of labour			
Pest Control	Time is limited	328	64.9	35.1
	Lack of finance			
	Lack of tools			
Farm inputs/ Fertilizers	Pesticides are expensive	319	43.3	56.7
	Lack of knowledge on which pesticides to use			
	Lack of pesticides			
Harvesting	Hard to get the fertilizers due to finance	315	45.4	54.6
	Uses animal waste/manure			
	Lack of equipment to use during cultivation			
Acreage under crops	Lack of knowledge on how to use the fertilizers	302	43.4	56.6
	Transportation of the harvest is difficult			
	Lack of labor			
Farm labor	Crop failure	309	48.9	51.1
	Lack of money			
	Increased because of acquiring oxen			
Loss of livestock	Crop failure	310	56.8	43.2
	Lack of food make us not work			
	Tools not affordable			
	Lack of finance for cultivation	310	56.8	43.2
	Lack of food			
	Sharing of animals during ploughing time			
	Too much land and very few people to work	310	56.8	43.2
	Lack of enough labour due to old age			
	Lack of food			
	The livestock are affected by various diseases	310	56.8	43.2
	Lack of finance for the treatment of livestock			

### C. Impact on Access to Nutritious Food

#### 1. Traditional Foods that Became Extinct

As an indicator of possible impact of livelihood shocks including HIV/AIDS, 46% of respondents indicated that traditional vegetables have become extinct. Several farm activities were affected leading to downstream effects on food production, these include planting,  $\{\chi^2(1, N = 321), = 113.146, p = 0.000\}$ , land preparation  $\{\chi^2(1, N = 310) = 41.689, p = 0.000\}$  and pest control  $\{\chi^2(1, N = 320), = 29.28 p = 0.000\}$ . This was further illustrated by the fact that most respondents (73.2%) reported that they only cultivate up to 2 acres of land. With only a small percentage 2.4% cultivating 5 acres and above as illustrated in Table VI.

TABLE VI  
FOODS WHICH HAVE BECOME EXTINCT

Foods	Frequency (n=309)	Percent (%)
Traditional vegetables	142	46.0
Potatoes	46	14.9
Simsim	45	14.6
Cassava	41	13.3
Ghee	33	10.7
Fish	32	10.4
Sweet potatoes ( <i>i.batata</i> )	23	7.4
Aliya Meat ( <i>smoked meat</i> )	20	6.5
Fermented milk	18	5.8
Animal blood	13	4.2
Birds e.g. <i>Quelea</i>	11	3.6
Kuon anang'a	7	2.3
Irish potatoes	6	1.9
Fermented porridge	6	1.9
Cowpeas	5	1.6
Fruits	5	1.6
Nyasi gumba	5	1.6

## 2. Impact on Livestock Production

About 80% of households in Pala keep livestock either zebu, goats, sheep and chicken. Most livestock graze on natural pastures and hence livestock farming a labor intensive activity in the community. Sale of animals and livestock products contributes considerably to generation of income for extraordinary expenses like school fees. Respondents indicated that livestock keeping has been affected in several ways. This has further contributed to food insecurity.

## 3. Lack of Food

As shown in Table VII, majority of respondents (97.2%) indicated the lack of food for six months from January to June. During this time, most (90%) indicated they buy food only 6% getting support from their relatives.

TABLE VII  
SEASONAL FOOD DEFICIENCY IN PALA

Response	Frequency	Percent (%)
Yes	346	97.2
No	10	2.8
Total	356	100.0

## IV. RECOMMENDATION

This study gives evidence of impact of HIV on food production in Pala Bondo district in Kenya. It further demonstrates the serious impact on demographics of the study population. This suggests that there is urgent need to constitute interventions by:-

1. Introduction of labor saving technologies like the drip irrigation, multistory garden, among others
2. Repackaging of extension services to target younger generation as HIV impact has affected demographic structure hence the knowledge trans mission from adults to the young.
3. Re-Introduction of more nutritious crops since the evidence show extinction of traditional nutrient rich crops/vegetables

## REFERENCES

- [1] Bernet T (1989) The Effects of HIV/AIDS on farming Systems and Rural Livelihood in Uganda, Zambia and Tanzania, Norwich UK.
- [2] FAO (2005) Food Security and Food Projects Analysis; FAO Rome.
- [3] Jayne T, Marcela V, Pingali P, Hemrich G,(2005) HIV and Agricultural Sector Implication for Agriculture Policy in Southern and Eastern Africa: Electronics Journal of Agriculture and Development Economics; 2;2 158-181.
- [4] Clare-Bishop Sambrouk (2003); Labour constraints and Impact of HIV/AIDS on Rural Livelihood in Bondo and Busia Counties Western Kenya; A joint Study of IFAD and FAO, Funded by Japanese.
- [5] Republic of Kenya (2004); Impact of HIV/AIDS on Small Holder Farmers in Kenya and How Ministry of Livestock can respond; 40.
- [6] Republic of Kenya (2004) Impact of HIV/AIDS on fisheries in Kenya; 35.
- [7] United Nations Department of Economics and Social Affairs /Population Division; HIV and AIDS (2008) Special Report.